

CLAIMS:

1. A polysulfone semipermeable membrane, the polysulfone semipermeable membrane comprising a mixture of: a polysulfone compound and a solvent for the polysulfone compound, and the polysulfone semipermeable membrane having a homogeneous structure such that the polysulfone semipermeable membrane has a substantially uniform structure.

2. The polysulfone semipermeable membrane of Claim 1, wherein the polysulfone compound is a polyarylsulfone compound.

3. The polysulfone semipermeable membrane of Claim 1, wherein the polysulfone compound is selected from the group consisting of bisphenol A polysulfone, polyether polysulfone, polyphenyl polysulfone, and mixtures thereof.

4. The polysulfone semipermeable membrane of Claim 1, wherein the solvent is selected from the group consisting of tetramethylene sulfone, antipyrine, -valerolactam, diethyl phthalate, and mixtures thereof.

5. A polysulfone semipermeable membrane defined by a composition comprising a mixture of a polysulfone compound, a solvent for the polysulfone compound, and a non-solvent for the polysulfone compound, and the polysulfone semipermeable membrane having a homogeneous structure such that the polysulfone semipermeable membrane has a substantially uniform structure.

6. The polysulfone semipermeable membrane of Claim 5, wherein the non-solvent is selected from the group consisting of 1, 1-diethylurea, 1,3-diethylurea, dinitrotoluene, 1,2-ethane diamine, diphenylamine, toluenediamine, o-toluic acid, m-toluic acid, toluene-3,4-diamine, dibutyl phthalate, piperidine, decalin, cyclohexane, cyclohexene, chlorocyclohexane, cellosolve solvent, n,n-dimethylbenzylamine, paraffin, mineral oil, mineral wax, tallow amine,

triethanol amine, lauryl methacrylate, stearic acid, di(ethylene glycol), tri(ethylene glycol), ethylene glycol, poly(ethylene glycol), tetra(ethylene glycol), glycerin, diethyl adipate, d-sorbitol, chlorotriphenyl stannane, resorcinol, 2-methyl-8-quinolinol, quinaldine, 4-phenylpyridine, phosphorothioic acid, o,o-diethyl o-(p-nitrophenyl) ester, N,N-dimethyl-p-phenylene diamine, 2, 6-dimethoxyphenol, 4-allyl-2-methoxyphenol, phenanthridine, 2-naphthylamine, 1-naphthylamine, 1-naphthol, 2-naphthalenethiol, 1-bromonaphthalene, levulinic acid, phenyl pyrrol-2-yl ketone, phenyl 4-pyridyl ketone, isothiocyanic acid, m-nitrophenyl ester, 2-methyl-1H-indole, 4-methyl imidazole, imadazole, 1,7-heptanediol, 9H-fluoren-9-one, ferrocene, 2,2',2''-nitrilotriethanol, 2,2'-iminodiethanol, dibenzofuran, cyclohexaneacetic acid, cyanamide, coumarin, 2,2'-bipyridine, benzoic acid, benzenepropionic acid, o-dinitrobenzene, 9-methyl-9-azabicyclo(3.3.1)nonan-3-one, chlorodiphenylarsine, antimony bromide, p-anisidine, o-anisaldehyde, adiponitrile, p-amino acetophenone, monoacetin, diacetin, triacetin, pentoxane, 4-benzoylbiphenyl, methyl oleate, triethylphosphate, butyrolactone, terphenyl, tetradecanol, polychlorinated biphenyl, myristic acid, methacrylic acid, dodecyl ester, isocyanic acid, methylenedi-p-phenylene ester, 2-((2-hexyloxy)ethoxy) ethanol, 4-nitro biphenyl, benzyl ether, benzenesulfonyl chloride, 2,4-diisocyanato-1-methyl benzene, adipic acid, diethyl ester, 2'-nitro-acetophenone, 1'-acetophenone, tetradecanone, (dichlorophenyl)trichlorosilane, dichlorodiphenyl silane, phosphorothioic acid, o,o-diethyl o-(p-nitrophenyl) ester, phosphoric acid, tri-o-tolyl ester, phosphoric acid, triphenyl ester, phosphoric acid, tributyl ester, phenyl phosphorous dichloride, p-nitrophenol, isocyanic acid, methyl-m-phenylene ester, 2,2'-iminodiethanol, N-(2-aminoethyl)-N'-(2-((2-aminoethyl)amino)ethyl) 1,2-ethanediamine, 2,6-di-tert-butyl p-cresol, chloro biphenyl, 4-biphenylamine, benzyl ether, benzenesulfonyl chloride, 1,2-(methylenedioxy)-4-propenyl benzene, 2,4-diisocyanato-1-methyl benzene, chlorodinitro benzene (mixed isomers), hexahydro 2H-azepin-2-one, 4,4'-methylenedianiline, 1'-acetophenone, mercapto acetic acid, acetanilide, glycerol, and mixtures thereof.

7. The polysulfone semipermeable membrane of Claim 5, wherein the polysulfone compound is a polyarylsulfone compound.

8. The polysulfone semipermeable membrane of Claim 5, wherein the polysulfone compound is selected from the group consisting of bisphenol A polysulfone, polyether polysulfone, polyphenyl polysulfone, and mixtures thereof.

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9. The polysulfone semipermeable membrane of Claim 5 wherein the polysulfone compound comprises bisphenol A polysulfone.

10. The polysulfone semipermeable membrane of Claim 5, comprising between about 8 and about 80 percent by weight polysulfone compound.

11. The polysulfone semipermeable membrane of Claim 5, comprising at least about 25 percent by weight polysulfone compound.

12. The polysulfone semipermeable membrane of Claim 5, wherein the solvent is selected from the group consisting of tetramethylene sulfone, 3-methyl sulfolane, benzophenone, n,n-dimethylacetamide, 2-pyrrolidone, 3-methylsulfolene, pyridine, thiophene, o-dichlorobenzene, 1-chloronaphthalene, methyl salicylate, anisole, o-nitroanisole, diphenyl ether, diphenoxy methane, acetophenone, p-methoxyphenyl-2-ethanol, 2-piperidine, antipyrine, -valerolactam, diethyl phthalate, diphenyl sulfone, diphenyl sulfoxide, phthalic acid, dioctyl ester, phthalic acid, dimethyl ester, phthalic acid, diethyl ester, phthalic acid, dibutyl ester, phthalic acid, bis(2-ethylhexyl) ester, phthalic acid, benzyl butyl ester, phenyl sulfide, and mixtures thereof.

13. The polysulfone semipermeable membrane of Claim 5, wherein the solvent is selected from the group consisting of tetramethylene sulfone, antipyrine, -valerolactam, diethyl phthalate, and mixtures thereof.

14. The polysulfone semipermeable membrane of Claim 5, wherein the solvent comprises tetramethylene sulfone.

15. The polysulfone semipermeable membrane of Claim 5, wherein the solvent and non-solvent are present in a ratio of about 2:1 to about 10:1.

16. A polysulfone semipermeable membrane having a substantially uniform structure throughout a thickness dimension of the membrane, the polysulfone semipermeable membrane being constructed from a mixture of a polysulfone compound selected from the group consisting of a polyarylsulfone compound, bisphenol A polysulfone, polyether polysulfone, polyphenyl polysulfone, and mixtures thereof, and a solvent for the polysulfone compound selected from the group consisting of tetramethylene sulfone, 3-methyl sulfolane, benzophenone, n,n-dimethylacetamide, 2-pyrrolidone, 3-methylsulfolene, pyridine, thiophene, o-dichlorobenzene, 1-chloronaphthalene, methyl salicylate, anisole, o-nitroanisole, diphenyl ether, diphenoxy methane, acetophenone, p-methoxyphenyl-2-ethanol, 2-piperidine, antipyrine, -valerolactam, diethyl phthalate, diphenyl sulfone, diphenyl sulfoxide, phthalic acid, dioctyl ester, phthalic acid, dimethyl ester, phthalic acid, diethyl ester, phthalic acid, dibutyl ester, phthalic acid, bis(2-ethylhexyl) ester, phthalic acid, benzyl butyl ester, phenyl sulfide, and mixtures thereof.

17. The polysulfone semipermeable membrane of Claim 16, wherein the mixture includes a non-solvent for the polysulfone compound.

18. The polysulfone semipermeable membrane of Claim 16, wherein the non-solvent is selected from the group consisting of 1, 1-diethylurea, 1,3-diethylurea, dinitrotoluene, 1,2-ethane diamine, diphenylamine, toluenediamine, o-toluic acid, m-toluic acid, toluene-3,4-diamine, dibutyl phthalate, piperidine, decalin, cyclohexane, cyclohexene, chlorocyclohexane, cellosolve solvent, n,n-dimethylbenzylamine, paraffin, mineral oil, mineral wax, tallow amine, triethanol amine, lauryl methacrylate, stearic acid, di(ethylene glycol),

tri(ethylene glycol), ethylene glycol, poly(ethylene glycol), tetra(ethylene glycol), glycerin, diethyl adipate, d-sorbitol, chlorotriphenyl stannane, resorcinol, 2-methyl-8-quinolinol, quinaldine, 4-phenylpyridine, phosphorothioic acid, o,o-diethyl o-(p-nitrophenyl) ester, N,N-dimethyl-p-phenylene diamine, 2, 6-dimethoxyphenol, 4-allyl-2-methoxyphenol,

5 phenanthridine, 2-naphthylamine, 1-naphthylamine, 1-naphthol, 2-naphthalenethiol, 1-bromonaphthalene, levulinic acid, phenyl pyrrol-2-yl ketone, phenyl 4-pyridyl ketone, isothiocyanic acid, m-nitrophenyl ester, 2-methyl-1H-indole, 4-methyl imidazole, imadazole, 1,7-heptanediol, 9H-fluoren-9-one, ferrocene, 2,2',2''-nitrilotriethanol, 2,2'-iminodiethanol, dibenzofuran, cyclohexaneacetic acid, cyanamide, coumarin, 2,2'-bipyridine, benzoic acid,

10 benzenepropionic acid, o-dinitrobenzene, 9-methyl-9-azabicyclo(3.3.1)nonan-3-one, chlorodiphenylarsine, antimony bromide, p-anisidine, o-anisaldehyde, adiponitrile, p-amino acetophenone, monoacetin, diacetin, triacetin, pentoxane, 4-benzoylbiphenyl, methyl oleate, triethylphosphate, butyrolactone, terphenyl, tetradecanol, polychlorinated biphenyl, myristic acid, methacrylic acid, dodecyl ester, isocyanic acid, methylenedi-p-phenylene ester, 2-((2-

15 hexyloxy)ethoxy) ethanol, 4-nitro biphenyl, benzyl ether, benzenesulfonyl chloride, 2,4-diisocyanato-1-methyl benzene, adipic acid, diethyl ester, 2'-nitro-acetophenone, 1'-acetophenone, tetradecanone, (dichlorophenyl)trichlorosilane, dichlorodiphenyl silane, phosphorothioic acid, o,o-diethyl o-(p-nitrophenyl) ester, phosphoric acid, tri-o-tolyl ester, phosphoric acid, triphenyl ester, phosphoric acid, tributyl ester, phenyl phosphorous

20 dichloride, p-nitrophenol, isocyanic acid, methyl-m-phenylene ester, 2,2'-iminodiethanol, N-(2-aminoethyl)-N'-(2-((2-aminoethyl)amino)ethyl) 1,2-ethanediamine, 2,6-di-tert-butyl p-cresol, chloro biphenyl, 4-biphenylamine, benzyl ether, benzenesulfonyl chloride, 1,2-(methylenedioxy)-4-propenyl benzene, 2,4-diisocyanato-1-methyl benzene, chlorodinitro benzene (mixed isomers), hexahydro 2H-azepin-2-one, 4,4'-methylenedianiline, 1'-

25 acetophenone, mercapto acetic acid, acetanilide, glycerol, and mixtures thereof.